TMJ3O

Manufacturing

Metal Plant Table

Abstract

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TABLE CONTENTS

Project Overview……Page 4
- Project Challenge
- Connections
- Project Criteria
- Examples
- Project Synopsis and Timelines……Page 6
  - Activity 1 Planning Manufacturing Operations……Page 8
  - Activity 1 Criteria and Instructions
  - Activity 1 Prior Knowledge
  - Activity 1 Planning Notes……Page 9
- Action Introduce or Extend Learning
  - Activity 1 Instructional Strategies……Page 10
  - Activity 1 Assessment and Evaluation……Page 12
  - Activity 1 Accommodations……Page 14
- Consolidation & Connections (Provide Opportunities for Reflection)..... Page 15
  - Activity 1 Reflection Activities
- Materials, Tools and Resources
  - Activity 1 Materials and Tools
  - Activity 1 Computer Software……Page 16
  - Activity 1 Human Resources
  - Activity 1 Appendices
  - Activity 2 Project Development and Production……Page 17
  - Activity 2 Prior Knowledge
  - Activity 2 Planning Notes……Page 18
- ACTION Introduce or Extend Learning
  - Activity 2 Instructional Strategies……Page 19
  - Table Top Assembly
  - Table Legs & Support Assembly
  - Table Top, Legs & Support Assembly
  - Activity 2 Assessment and Evaluation……Page 22
  - Activity 2 Accommodations……Page 23
- Consolidation & Connections (Provide Opportunities for Reflection)
  - Activity 2 Reflection……Page 24
- Materials, Tools and Resources……Page 25
  - Activity 2 Publications
  - Activity 2 Computer Software
  - Activity 2 Human Resources
  - Activity 2 Appendices……Page 26

Activity 3 Project Portfolio and Presentation
Activity 3 Criteria and Instructions
Activity 3 Prior Knowledge……Page 27
Activity 3 Planning Notes
ACTION Introduce or Extend Learning
Activity 3 Instructional Strategies……Page 28
Activity 3 Assessment and Evaluation
Activity 3 Accommodations……Page 29
Consolidation & Connections
Provide Opportunities for Reflection……Page 30
Activity 3 Reflection Paper and Presentation
Materials, Tools and Resources……Page 31
Activity 3 Publications
Activity 3 Computer Software
Activity 3 Human Resources
Activity 3 Appendices
MANUFACTURING PLANNING OPERATIONS ASSESSMENT ACTIVITY 1.1 ASSESSMENT RUBRIC……Page 32
MANUFACTURING PLANNING OPERATIONS EVALUATION ACTIVITY 1.1 EVALUATION RUBRIC……Page 34
PROJECT DEVELOPMENT ASSESSMENT. ACTIVITY 1.2 ASSESSMENT RUBRIC
PROJECT DEVELOPMENT EVALUATION. ACTIVITY 1.2 EVALUATION RUBRIC
SUPPORTING DOCUMENTS AND PRESENTATION. ACTIVITY 1.3 ASSESSMENT RUBRIC……Pge 40
SUPPORTING DOCUMENTS AND PRESENTATION. ACTIVITY 1.3 EVALUATION RUBRIC……Page 42

Project Overview

Students will use the design process in the construction of a metal plant table. Students will work collaboratively to generate ideas and then students will create an individual plan defining the necessary steps for project completion. Multiple opportunities for critical thinking, brainstorming and collective behaviour will help enable students adjust and continue with next steps. Through meaningful learning, students will complete each part of the design process focusing on the safe use of shop tools and equipment to connect theory to application and creativity. Learning across subject disciplines with an emphasis on numeracy and literacy, students will have learned transferable skills preparing them for future opportunities and challenges..

Project Challenge

The challenge for the student is to construct a table using the design process with emphasis on following a plan safely and productively. Staying on task is demonstrated by organized supporting documents including daily work logs and reflections. Productivity is measured by individual student's abilities and available equipment and tools in constructing the table. A presentation and reflection submission concludes the project giving students an opportunity to present their accomplishment and achievement. Fundamental Technological concepts addressed at this stage of the project are aesthetics, environmental sustainability, function, innovation and systems.

Connections

SEF Component 1 Assessment for,as and of Learning.

Indicator 1.1 Assessment is connected to the curriculum Fundamental Technological Concepts. Pg. 5,6

SEF Component 4 Curriculum Teaching and Learning.

Indicator 4.5 Instruction and assessment are differentiated in response to student strengths, needs and prior learning.

Project Criteria

Criteria should be adjusted to reflect the actual available equipment at the given school.
Sketch:

- Students must create a hand drawn or computer generated sketch of what they believe their table design looks like.

Material List:

- All material used in constructing the table.

Cut List:

- A detailed list of metal to be cut including waste.

Examples

SEF Component 5 Pathways Planning and Programming
Indicator 5.2 Opportunities for authentic learning experiences

SEF Component 4 Curriculum, Teaching and Learning
Indicator 4.3 Teaching and learning in the 21st Century
Indicator 4.2 A clear emphasis on high levels of achievement in literacy and numeracy

• Bringing together an understanding of requirements allows students to group tasks and brainstorm methods - required steps to complete the table. Equipment List: • All equipment used to manufacture project. Work Log: • Daily recording of operations and reflections. Job list must be aligned with calendar. • A plan must be plotted on a calendar or chart to acknowledge efficient completion of the table.	 

Project Synopsis and Timelines

ACTIVITY #	ACTIVITY NAME	TIME HRS.	CURRICULUM EXPECTATIONS	ASSESSMENT AND EVALUATION	CONNECTIONS
1.1	Planning Manufacturing Operations. • Criteria and Instructions • Prior Knowledge • Prior notes • Instructional Strategies • Assessment and Evaluation • MANUFACTURING PLANNING OPERATIONS ASSESSMENT ACTIVITY 1.1 ASSESSMENT RUBRIC • MANUFACTURING PLANNING OPERATIONS EVALUATION ACTIVITY 1.1 EVALUATION RUBRIC • Accommodations • Reflection Paper	2.5	Manufacturing Technology Fundamentals. A1.2 A1.3 A1.4 A2.1 A2.2 A2.3 A3.1 A3.2 A3.3	K/U T C Learning Skills and Work Habits. Achievement Chart.	▪ Ontario Curriculum ▪ Growing Success ▪ DI ▪ SEF ▪ Leading Math Success ▪ Literacy ▪ Equity Inclusive… ▪ FNMI ▪ ICE
1.2	Fabrication • Prior Knowledge • Planning Notes • Instructional Strategies • Assessment and Evaluation • PROJECT DEVELOPMENT ASSESSMENT. ACTIVITY 1.2 ASSESSMENT RUBRIC • PROJECT DEVELOPMENT EVALUATION. ACTIVITY 1.2 EVALUATION RUBRIC • Accommodations • Reflection Paper/ Work Log	10	Manufacturing Technology Skills. B1.1 B1.2 B1.3 B1.4 B1.5 B2.1 B2.2 B2.3 B2.4 B3.1 B3.2 B3.3 B3.4 B4.1 B4.2	K/U T C APP Learning Skills and Work Habits. Achievement Chart.	▪ Ontario Curriculum ▪ Growing Success ▪ DI ▪ SEF ▪ Leading Math Success ▪ Literacy ▪ Equity Inclusive…
1.3	Supporting Documents. Presentation. Reflection. • Criteria and Instructions • Prior Knowledge • Planning Notes • Instructional Strategies • Assessment and Evaluation • SUPPORTING DOCUMENTS AND PRESENTATION. ACTIVITY 1.3 ASSESSMENT RUBRIC • SUPPORTING DOCUMENTS AND PRESENTATION. ACTIVITY 1.3 EVALUATION RUBRIC • Accommodations • Reflection Paper and Presentation	4	Technology, The Environment and Society. C1.2 C1.3 Professional Practice and Career Opportunities. D1.1 D1.2 D1.3 D1.4 D1.5 D2.4 D2.6	K/U T C APP Learning Skills and Work Habits. Achievement Chart.	▪ Ontario Curriculum ▪ Growing Success ▪ DI ▪ SEF ▪ Leading Math Success ▪ Literacy ▪ Equity Inclusive… ▪ FNMI ▪ ICE

CONNECTIONS RESOURCE LIST	
The Ontario Curriculum, Grade 11-12, Revised 2009	http://www.edu.gov.on.ca/eng/curriculum/secondary/2009teched1112curr.pdf
2 Growing Success	http://www.edu.gov.on.ca/eng/policyfunding/growSuccess.pdf
Student Success: Differentiated Instructions Educator's Package,2010(DI)	http://www.edugains.ca/resourcesDI/EducatorsPackages/DIEducatorsPackage2010/2010EducatorsGuide.pdf
School Effectiveness Framework	2013 (SEF) http://www.edu.gov.on.ca/eng/literacynumeracy/SEF2013.pdf
Think Literacy	http://www.edu.gov.on.ca/eng/studentsuccess/thinkliteracy/
Leading Math Success	http://www.edu.gov.on.ca/eng/document/reports/numeracy/numeracyreport.pdf
Ontario First Nations, Metis, and Inuit Education Policy Framework (FNMI)	http://www.edu.gov.on.ca/eng/aboriginal/fnmiFramework.pdf
Ontario's Equity and Inclusive Education Strategy	http://www.edu.gov.on.ca/eng/policyfunding/equity.pdf
Ontario Skills Passport (OSP)	http://www.skills.edu.gov.on.ca/OSP2Web/EDU/DisplayEssentialSkills.xhtml
OCTE Resources: SafeDocs, SafetyNet, Emphasis Courses	http://www.octelab.com/
Learning for All, Universal Design and Differentiated Instruction	http://www.edu.gov.on.ca/eng/general/elemsec/speced/LearningforAll2013.pdf
Kahoot	https://getkahoot.com/ways-to-play
Professional Learning Framework	http://www.oct.ca/-/media/PDF/Professional%20Learning%20Framework/framework_e.pdf
The Ontario Curriculum, Grade 9 , Revised 2009	http://www.edu.gov.on.ca/eng/curriculum/secondary/teched910curr09.pdf

MINDS ON

ENGAGING PRIOR KNOWLEDGE

Activity 1 Planning Manufacturing Operations

Activity Description:
It is important for students to understand the importance of being productive in the workplace. Emphasis should be placed on planning and adjustments necessary to be more productive. With each students individual strengths, a plan can be put together in completing the project with methods that are primarily safe to use but also the most efficient for that particular student. Completing a step by step process with pauses and reflection can help students evaluate and assess challenges and obstacles. Being the most efficient worker with an ability to recognize areas requiring improvement helps prepare students to be adaptable and able to create solutions and forecast contingencies as change occurs.

Activity 1 Criteria and Instructions

- Sketch: A rough drawing of the table with an emphasis on a 3 sided view or an isometric projection.
- Material list: A list including all material used to make the table as well as tile and paint.
- Cut list: A detailed list of all material to be cut including measurements and angles.
- Equipment List: All equipment needed to fabricate the table including PPE
- Job List/Plan: A step by step instruction on how to complete the table from start to finish.

Activity 1 Prior Knowledge	Connections
Knowing your student is key to success. To be able to design a customized plan of operations the teacher needs to know and understand the learner. Other than safety and equipment competency, students personality including likes and dislikes, strengths and areas requiring improvement must also be explored to increase chances of success. This could also include cultural differences and special needs not identified in an IEP. Collecting data on your students can include assessment activities that allow for students to display personal opinions and generate solutions. Areas to look for are collective behaviour, technology literacy, critical thinking, problem	SEF Component 1 Assessment for,as and of Learning. Indicator 1.1 Assessment is connected to the curriculum Ontario Skills Passport. Pg. 29 SEF Component 3 Student Engagement

solving and leadership skills. School team leaders such as guidance, SERT`s, social workers, special education, parents and school administration can also help in identifying strategies to ensure success for the student. Getting to know your students can help in other parts of the teaching spectrum including classroom management and cross curricular with participating teachers. **Use of tools and equipment** that will be used in the construction of the project are: • Tape measure • Vice • Chop saw cold cut saw • Horizontal band saw • Vertical band saw • Shear • Oxygen Fuel Cutting • Hand grinders • Pedestal grinders • Files • Sand paper • Deburring tool • Tile cutter • Metal scroller • Jigs & Fixtures • Welding processes • Computer Assisted Design software • Graph paper & Ruler • Computer sharing software • Metal adhesive • Whiteboard blackboard Students abilities and acknowledgement by the teacher are recorded in the Safety Passport.	Indicator 3.1 The teaching and learning environment is inclusive. **SEF Component 4 Curriculum, Teaching and Learning** Indicator 4.5 Instruction and assessment are differentiated. **SEF Component 1 Assessment for, as and of Learning** Indicator 1.2 A variety of relevant and meaningful assessment data **GS.Table 4.2 Assessment Framework:**What the learner needs to get there• Providing descriptive feedback that moves learners forward (i.e., outlining what was done well, what needs improvement, and how to improve) • Engaging students as learning resources for one another • Empowering students to become owners of their own learning **ICE – connection:** Allow students to understand the world from the perspectives of others, generate new ideas, and give students the confidence to develop strategies to implement and sustain their ideas
Activity 1 Planning Notes	**Connections**
• Discuss math and literacy issues with past and current teachers of students who show a level of concern for completing the various drawings and lists. • Assure computers are working and available for students who are more comfortable using a keyboard and mouse. • Have appropriate supplies on hand including graph paper, scrap paper, rulers, calculators, erasers and any other supplies needed to complete drawing and lists. • Hard copies of calendar months also should be printed in advance. • Have rubrics and templates accessible.	**SEF Component 1 Assessment for, as and of Learning** Indicator 1.2 A variety of relevant and meaningful assessment data **THINK LITERACY** Writing for a Purpose: Using Templates, Writing a Report **SEF Component 4 Curriculum, Teaching and Learning**

	Indicator 4.3 Teaching and learning in the 21st Century **FNMI** All students in Ontario will have knowledge and appreciation of contemporary and traditional First Nation, Métis, and Inuit traditions, cultures, and perspectives. Inclusion of ideas from all students. OCTE Resources: SafeDocs, SafetyNet

Action Introduce or Extend Learning

Activity 1 Instructional Strategies	Connections
Teacher: ● Clearly define the required manufacturing processes by showing samples of individual parts and completed tables. ● Demonstrate literacy components with both hard copies and computer generated options ● Initiate research and solution finding by listing steps. This can be done through concept maps or checklists. ● Help students focus in on a single plan with contingencies for potential bottlenecks such as cutting and welding. ● Allow for group work as long as each individual has their own plan. Student: ● Demonstrate an acknowledgement of challenge by producing a sketch on graph paper or computer generated drawing. ● Work in a group of 4 or less or as an individual to brainstorm and research design process including estimated times of completion and level of efficiency. ● List process to complete table including contingency plan pertaining to equipment and bottlenecks. What other equipment can you use if a certain tool is broken or being used.	**SEF Component 4 Curriculum, Teaching and Learning** Indicator 4.5 Instruction and assessment are differentiated **SEF Component 4 Curriculum, Teaching and Learning** Indicator 4.2 A clear emphasis on high levels of achievement in literacy and numeracy **Edugains** - *Self Assessment Viewing Guide* **-** Highlight and integrate assessment language and skills into all learning experiences. - Share with students up front what you are doing with criteria, and why. **Literacy Connection** Reading (research) Strategy: Engaging in Reading

• Define a set of steps to complete project including the following lists: • Material List: All the material needed to complete table including scrap • Cutting List: All cuts need to be made on the metal to construct the table including all measurements and loss due to certain cutting processes. • Job List/ Instructions: A step by step list of procedures of how to make the table including all equipment and material with measurements and temperatures. • Equipment List: All the equipment that will be used to construct the table. • Record and complete a daily log or journal either by hand or computer generated. • Use a calendar to estimate completion of individual steps.	▪ Sorting Ideas Using a Concept Map can be used in documenting their research on themes and styles **Leading Math Success:** Engaging Students • Students' engagement in learning depends on studying topics that relate to their own lives. Students report feeling most engaged when they help define the content to be studied; have time to pursue areas of most interest; are encouraged to raise questions and view topics in new ways; have passionate, inventive, and respectful teachers; and sense that their study is open-ended rather than predetermined and predictable (Black, 2003). **Growing Success – Learning Skills:** Teachers can assist students in developing capacity to understand their own interpretation of their achievement through learning skills. **Growing Success** The five strategies, adapted from Black and William (p. 8), are: • identifying and clarifying learning goals and success criteria; • engineering effective classroom discussions and other learning tasks that elicit information about student learning; • providing feedback that helps learners move forward; • through targeted instruction and guidance, engaging students as learning resources for one another; • through targeted instruction and guidance, helping students understand what it means to "own"

	their own learning, and empowering them to do so. **SEF Component 3 Student Engagement** Indicator 3.3 Students are partners in dialogue Indicator 3.4 Students demonstrate a wide range of transferable skills **THINK LITERACY** Small Group Discussions: Group Roles Encourage work share and leadership roles and assisting roles.
Activity 1 Assessment and Evaluation	**Connections**
Assessment During planning, students are guided to completing a detailed plan of operations. Their work skills and learning habits can be assessed for reflection towards the completion of the table. Multiple checklists providing levels of comprehension must be used and shared at different stages of planning. Assessment Rubric: Manufacturing Industry: • Identification of design process.Sketch, Work Lists • Alternative operations.Group production vs. indivual Design Fundamentals: • Description of specific plan for completion • Detailed use of equipment including recycling and waste • Proper setup and use of a journal or electronic sharing Materials, Tools and Equipment • Safety passport • Safety Acknowledgement • Tool Identification Lists must be cross referenced with students abilities and safe equipment use. Although some of the production will be done in groups such as cutting, each student must have their own individual plan. At this stage it is more important for the student to know what is the next step in completion. Through observation and interview, checklists can be completed. Samples of parts at various stages of completion allows for dialogue and proof of understanding.Initiating opportunities for students to provide solutions will encourage collaboration with the teacher. Lists must be shared with students for their own reflection of what they need to change. Change is done with the teachers support and guidance through open dialogue and review	**SEF Component 1 Assessment for,as and of Learning.** Indicator 1.1 Assessment is connected to the curriculum. Manufacturing Technology Fundamentals A1, A2, A3 **The Ontario Curriculum, Grade 9 , Revised 2009** http://www.edu.gov.on.ca/eng/curriculum/secondary/teched910curr09.pdf MANUFACTURING PLANNING OPERATIONS ASSESSMENT ACTIVITY 1.1 ASSESSMENT RUBRIC

of submissions in a fast and timely manner. Evaluation: ● Setting a date for submission of supporting documents will encourage students to stay within timelines. Sketches and plans including work lists can be gauged against a rubric using the checklists as bases towards a mark. Evaluation is a clear view of the students understanding of productivity and use of the design process. Evaluation Tools: Rubric for following lists and requirements: 1. Material List. 2. Equipment List. 3. Log Book Set Up including section for forecasts (electronic or written) 4. Calendar Set Up. Sketch is assessed and not evaluated. Teacher: ● Consistent updating of Checklist. ● Explanation of checklists. Why they are needed. ● Provide opportunities for sharing and advocacy. ● Make lists available to students to reflect and ask for assistance. Students: ● Provide supporting documents. ● Review checklists with teacher. ● Research alternative plans. ● Explain next steps. Knowledge and Understanding ● Assessing student knowledge and understanding of construction challenge through student interpretation of plan. Thinking ● Students ability to describe use of tools during steps ● Ability to develop solutions and alternatives ● Critical thinking and problem solving skills ● Student ability to plan and forecast a production plan Communication ● Students ability to present a plan ● Orally and Written ● Creative Submissions Application ● Assessing student's ability to demonstrate proper practice in the manufacturing facility to operate equipment manufacture products.	**SEF Component 1 Assessment for,as and of Learning.** Indicator 1.2 A variety of relevant and meaningful assessment data MANUFACTURING PLANNING OPERATIONS EVALUATION ACTIVITY 1.1 EVALUATION RUBRIC **Learning for All - Universal Design and Differentiated Instruction:** In differentiating instruction according to students' interests, a teacher attempts to increase the likelihood that any given lesson or project is highly engaging and personally meaningful for each student in the class. Teachers who know students' interests can vary projects, themes, and examples used in instruction to reflect those interests.
Activity 1 Accommodations	**Connections**

All students must be assessed during safety lessons and demonstrations to determine each students level of ability completing sketches, lists, instructions and other supporting documents either electronically or hard copies. All student concerns should be discussed with available supporting departments such as guidance, special education, math, english, administration and parents. This should be done before the planning stage ends. Accommodations can include: ● Education assistant ● Peer mentoring ● Teacher shadowing ● Alternative process ● Alternative working location ● Scribe ● Computer generated documents (google docs, google forms, google calendar, google sheets) ● Shareware (drop box) ● Over sized paper ● White board ● Cardboard ● Templates ● Word banks ● Templated duotangs	**SEF Component 1 Assessment for, as and of Learning** Indicator 1.2 A variety of relevant and meaningful assessment data **Learning for All - Universal Design and Differentiated Instruction:** In differentiating instruction according to students' interests, a teacher attempts to increase the likelihood that any given lesson or project is highly engaging and personally meaningful for each student in the class. Teachers who know students' interests can vary projects, themes, and examples used in instruction to reflect those interests **Learning for All** Provide the accommodations and/or modifications that are specified in the IEPs of students who have special education needs. **DI Different Options for Different Students.** • Have a choice of ways to learn and/ or ways to demonstrate their learning on an ongoing basis • Are routinely provided with, or choose when appropriate, ways to learn and/or ways to demonstrate their learning that are designed for their particular learning needs. **ONTARIO'S EQUITY AND INCLUSIVE EDUCATION STRATEGY** • all students, parents, and other members of the school community are welcomed and respected; • every student is supported and inspired to succeed in a culture of high expectations for learning.

Consolidation & Connections (Provide Opportunities for Reflection)

Activity 1 Reflection Activities	Connections
The lookfor is the proof of comprehension by the student. Having computers and hard copies available improve students chances of success but the importance should be on a completed plan including changes and contingencies in their daily Work Logs. The students level of comprehension can be assessed and relaid back to the student for them to develop next steps. Teachers: ● Consistently review and direct all communications on a daily basis. ● Guide students through timelines and next steps. ● Emphasis importance of submitted communication. Student: ● List work completed for the day. ● Compare and contrast planned work to actual work. ● Adjust timelines and expectations. ● Forecast potential challenges. ● Conference with teacher on everything.	**SEF Component 3 Student Engagement** Indicator 3.3 Students are partners in dialogue **SEF Component 4 Curriculum, Teaching and Learning** Indicator 4.2 A clear emphasis on high levels of achievement in literacy and numeracy **Edugains -** Using assessment to gather information about students' readiness, interests and learning preferences **DI** Categories of Instructional Strategies that Impact Student Achievement.Setting objectivesand providing feedback.Rubrics or checklists with clear learning goals and previously established assessment criteria.

Materials, Tools and Resources

Activity 1 Materials and Tools
Modern Welding. Student Success Differentiated Instruction Educator's Guide (2010) The Ontario Curriculum Grades 9 and 10. Technological Education. Revised 2009 School Effectiveness Framework 2013 Growing Success Leading Math Success

Think Literacy
Ontario's Equity and Inclusive Education Strategy
First Nations Metis Inuit

Activity 1 Computer Software

Board provided software.
Word processing.
Spreadsheet software.
CAD Software.

Activity 1 Human Resources

Educational Assistant
Industry Mentors
School IT specialist
Librarian

Anyone in the school who can improve the software communication between teacher and student.

Activity 1 Appendices

- MANUFACTURING PLANNING OPERATIONS ASSESSMENT ACTIVITY 1.1 ASSESSMENT CHECKLIST RUBRIC
- MANUFACTURING PLANNING OPERATIONS EVALUATION ACTIVITY 1.1 EVALUATION RUBRIC

Activity 2 Project Development and Production

Activity Description
At this stage, students will get the opportunity to apply their plan in the construction of the table. Fundamental Technological concepts that will be applied are fabrication, material, mechanism, power and energy, safety, structure and systems. Students will fabricate and assemble their table using the tools and equipment available in the shop. The safe use of power and non power tools will help connect students understanding of structure and interrelated systems in the completion of a project. The emphasis has to be put on aligning fabrication with the planning of manufacturing operations to the best of the student`s individual abilities and identified areas requiring improvement. Encouragement and empowering students will result in elevating student creativity and innovation.

MINDS ON

ENGAGING PRIOR KNOWLEDGE

Activity 2 Prior Knowledge	Connections
• attendance during lectures. • Conference with students, parents and all other staff who can aid in the success of the stIt is important to know your students abilities and areas of improvement pertaining to the safe use of powered equipment and tools. Keeping track of student comprehension during safety instruction, demonstration and evaluation is imperative to the safe and productive completion of the project. Individual student abilities and anxieties displayed during safety and planning should be addressed to ensure a successful experience during the creating stage of the design process. Teacher: • Outline all safety rules and routines of the shop. • Demonstrate and initiate conversation on the safe use of tools and equipment. • Record all levels of comprehension including student's high school career including guidance, serts and EA`s. • Share with student all equipment they have permission to use. Student: • Have safety permission forms signed by parents or guardians	SEF Component 1 Assessment for,as and of Learning. Indicator 1.1 Assessment is connected to the curriculum Ontario Skills Passport. Pg. 29 Indicator 1.2 A variety of relevant and meaningful assessment data Component 3 Student Engagement Indicator 3.1 The teaching and learning environment is inclusive ONTARIO'S EQUITY AND INCLUSIVE EDUCATION STRATEGY expectations for learning.• all students, parents, and other members of the school community are welcomed and respected; • every student is supported and

to work in the shop. • Listen and contribute to all safety lessons and demonstrations. • Prove comprehension and areas that require improvement. • Pass all safety tests and demonstrations. • Bring all questions and concerns to the teacher either in person or electronically.	inspired to succeed in a culture of high **SEF Component 5 Pathways Planning and Programming** Indicator 5.3 Students, parents, families, and educators
Activity 2 Planning Notes	Connections
• Ensure all safety precautions are taken and equipment is up to date and in functioning order such as fire extinguishers and ventilation fans and filters. • Have all recorded safety records on hand to ensure student only use what they have permission for. Update immediately. • PPE is clean and openly available to students and guests. • Have all communication initiated and accessible between students and teachers. • Have back up consumables such as blades, grinders welding tips including gas and wire. • Maintain a waste and recycling system to accommodate all students. • Allow for the safe storage of projects during completion stages. • Set-up cleaning stations and cleaning equipment including brooms, dust pans, shovels and recycling containers. • Maintain a clean safety station with updated first aid box.	**Ontario Skills Passport** Essential skills learned that are transferable Pgs. 33- 34 **Learning for All – A Guide to Effective Assessment and Instruction** **Personalization** – Education that puts the learner at the centre, providing assessment and instruction that are tailored to students' particular learning and motivational needs **THINK LITERACY** Generating the Ideas: Setting the Context **Professional Learning Framework -** PL Communities - develop strategies with colleagues to ensure delivery of effective practices: have design teacher co-teach the class an activity around sketching, CAD drawings - rotate students between both classes.

ACTION Introduce or Extend Learning

Activity 2 Instructional Strategies	Connections

Each student will have an individual plan of completion. Group students who are going to be using the same equipment to allow for bulk production such as cutting and grinding. All changes must be recorded and reflected upon at the end of the lesson. Students are only allowed to use the equipment and tools as stated in their Safety Passports.

Teachers

- Ensure all safety policies and safeguards are in working order.
- Demonstrate equipment use.
- Shadow students.
- Aid and assist.
- Assign peer mentors and experts.
- Monitor safety and trouble areas.
- Update checklists in real time.
- Monitor accommodations.
- Engage students to think critically and develop solutions.
- Anticipate mistakes to allow for teaching moments.
- Share both accomplishments and problems as learning opportunities.
- Promote a welcoming environment for everyone including guests.
- Having students use past experiences as inspiration for creativity helps promote a more independent learner and encourages characteristics of entrepreneurship and stewardship.

Student

Table Top Assembly

- Apply all safety rules and responsibilities including safety glasses, gloves, aprons and all other personal protective equipment.
- Choose a standard 12 inch by 12 inch tile ⅜ inch thick tile.
- Wood, plastic and metal at a minimum of ⅛" thickness and a ⅜ inch maximum thickness can be used in place of the tile.
- Tape around the perimeter of tile twice to provide clearance during assembly using regular painter's tape.
- Cut ⅜ inch square bar into 4 pieces. 2 at 12 inches and 2 at 12 ¾ inches.
- Choose a cutting process student have outlined in their Job List and ability to use as stated in Safety Passport.
- Clean burrs and excess metal with power or hand tools including file, sand paper or deburring tool.
- Place tile and all 4 cut ⅜ inch square bar pieces on a flat metal working table with proper ventilation.
- Frame the perimeter of the tile with the metal pieces so that

SEF Component 1 Assessment for,as and of Learning.

Indicator 1.1 Assessment is connected to the curriculum. Design Process Pg. 18, 19

ONTARIO'S EQUITY AND INCLUSIVE EDUCATION STRATEGY

Equity and inclusive education policies and practices will support positive learning environments so that all students can feel engaged in and empowered by what they are learning, supported by the teachers and staff from whom they are learning, and welcome in the environment in which they are learning. Students, teachers, and staff learn and work in an environment that is respectful, supportive, and welcoming to all.

Teacher Tip

Reference the SAFEdoc http://www.octelab.com/content/safedoc-manufacturing - site has multiple resources; lessons, templates, safety information sheets, tests etc.

OCTE Resources: SafeDocs, SafetyNet

Learning for All, pg. 16

Planning learning opportunities that will extend the learning of all students, whatever their level of achievement, and help each one reach his or her potential.

Growing Success

Ensuring multiple opportunities for students to demonstrate the full range of their learning by having practiced key skill development, and have received clear, specific and timely feedback to improve student learning

Leading Math Success.

Engaging Students • Students' engagement in learning depends on studying topics that relate to

they are against the tape touching each other tightly on the ends.
- Clamp metal 2 inches away from each corner using C clamps, jigs or fixtures.
- The length of each side including tile and metal should be a minimum of 12 ¾ inches. Tape should give you a little more.
- Fuse all outside corners with process tailored to student Job List including welding, brazing, fusion and metal adhesive.
- Keep tile and metal frame square and free from distortion.
- Check measurements periodically to make adjustments.
- Put away safely until next operation.
- Clean area and put away tools.
- Complete supporting documents: Daily work. Comparison to Work Schedule Calendar. Adjustment to Job List and Work Schedule. Forecasts of problems and concerns.

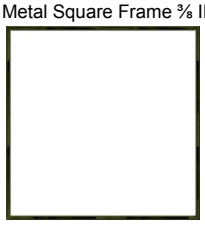
Table Legs & Support Assembly

- 7 pieces at 10 3/4 inches each using 1 inch by 1 inch square tubing is needed for the table legs and support.
- Clamp metal in groups of 4 to be cut on horizontal band saws.
- Clamp metal in groups of 2 to be cut on the cold saw and the chop saw.
- Cut each piece individually with any of the above tools and oxygen fuel or hand tools such as angle grinders and hack saws.
- Each student will need 6 and a half feet of 1 inch square bar or 78 inches. 2 ½ inches will be waste during the cutting process.
- Clean burrs and excess metal with power or hand tools including files, sand paper or deburring tool.
- Using a metal marking tool, measure 4 7/8 inches from each end and mark creating a 1 inch space in the middle of each piece.
- Place 3 pieces of 1 inch square bar on a flat metal table with proper ventilation.
- Using clamps and squares and a tape measure, place the pieces into the capital letter H placing the middle piece in the 1 inch marked spot.
- Fuse with appropriate process at each point of contact using welding, brazing, fusion or metal adhesive.
- Other than metal adhesive, only connect using the minimal amount of weld, braze or fusion to lesson distortion.
- Jigs and fixtures can be used to hold the assembled piece together during joining.
- Clean any protruding filler with grinder or other abrasives.
- Place 3 more pieces on top of the tacked capitol H using it as a jig. This ensures consistency in the legs and prevents unevenness.

their own lives. Students report feeling most engaged when they help define the content to be studied; have time to pursue areas of most interest; are encouraged to raise questions and view topics in new ways; have passionate, inventive, and respectful teachers; and sense that their study is open-ended rather than predetermined and predictable (Black, 2003).

⅜ INCH Square Bar

Metal Square Frame ⅜ INCH Square Bar



1 INCH Square Tubing

H Frame Legs 1 Inch Square Tubing

- Join together with minimal filler other than when using metal adhesive.
- Using a jig or fixture, have both sets of legs standing up 10 ¾ inches apart.
- Connect the 7th and final piece of 1 inch square tube to the middle of each set in its marked 1 inch space to deter distortion.
- Only use minimal filler to connect.
- Measure and adjust to remain square.

Table Top, Legs & Support Assembly

- Remove tile from ⅜ inch square bar frame.
- Place frame on a flat metal table with proper ventilation.
- Place connected legs on top of the frame making sure all corners sit either flush or just on the inside of the frame.
- The table should be upside down at this point for accessibility for final joining.
- All joining processes should be done at this point.
- Keep filler out of the area where the tile sits.
- Buff and grind all excess filler and sharp edges.
- Clean metal with degreaser and rag.
- Prepare for painting or clear coat.
- Take painters tape of tile and place in clean dry table top.
- The tile will be supported by the legs underneath.

Activity 2 Assessment and Evaluation

Assessment.
Areas of assessment will be based on the 2 variables. The ability to follow and adjust to the Job List and how productive was the manufacturing process and reflected through the Achievement Chart criteria.
Multiple rubrics outlining levels of comprehension must be used and shared at different stages of planning. Assessment must be shared with students to make all learning accomplishments and areas of improvement transparent and revisable.

Connections

SEF Component 1 Assessment for,as and of Learning.

Indicator 1.1 Assessment is connected to the curriculum. Manufacturing Technology Skills B1, B2, B3, B4

http://www.edu.gov.on.ca/eng/curriculum/secondary/teched910curr09.pdf

Assessment Rubric:

Design Process

- Accuracy to following a job list.
- Apply technological fundamental concepts such as fabrication, material, mechanism, power energy, safety, structure and systems.
- Keep track of all communications and supporting documents in an organized and transparent. electronic folder or hard copy.
- Use lists accurately.

Process Planning

- Use of appropriate materials and equipment
- Acknowledgement of challenges and detail of contingency plans.
- Preparing tools for layout and fabrication.
- Use appropriate methods of assembly.

Using Materials, Tools and Equipment

- The safe and proper use of hand tools, power tools, equipment.
- The proper cleanup and storage of all shop equipment.
- Work habits.
- Shop skills.
- housekeeping.

Metrology skills

- The proper use of measuring tools.
- The ability to accurately follow a cut list.
- The ability to inspect to evaluate and make changes.

Evaluation

Each stage of the manufacturing process of the table can be evaluated. Students have to be aware of all chances for success. A rubric outlining achievement levels will help guide students to reach their potential and receive the highest mark possible. Evaluation is based on the following:

Knowledge & Understanding

- Clearly communicated supporting documents proving comprehension of challenge.
- Correct equipment names and uses are listed.

Thinking

- Troubleshooting and solution developing skills
- Shop skills used through challenges and speed bumps.

Application

Indicator 1.2 A variety of relevant and meaningful assessment data

PROJECT DEVELOPMENT ASSESSMENT. ACTIVITY 1.2 ASSESSMENT RUBRIC

Component 3 Student Engagement

Indicator 3.1 The teaching and learning environment is inclusive
Indicator 3.2 Students' stated priorities that reflect the diversity, needs and interests
Indicator 3.3 Students are partners in dialogue

DI Categories of Instructional Strategies that Impact Student Achievement.Setting objectivesand providing feedback.Rubrics or checklists with clear learning goals and previously established assessment criteria.

Leading Math Success

Affective Domain
• It is important for the teacher to help all students feel confident about their ability to learn mathematics. This does not call for making fewer demands, modifying the curriculum, or setting lower standards. Instead, teachers of mathematics need to have a variety of strategies at hand for meeting the challenges of student learning (Posamentier & Stepelman, 1990).

Growing Success: Learning skills and work habits

The six skills and habits are:

• Physical shop work. • Use of tools and equipment. Communication • Organized collection of shared information. • The ability to display information in different formats. **Teacher** • Consistent updating of Checklist. • Explanation of checklists. Why they are needed. • Provide opportunities for sharing and advocacy. • Make lists available to students to reflect and ask for assistance. • Encourage creativity and challenges by introducing added features such as scrolled metal. • Show enthusiasm for student solutions and ideas. **Students** • Align supporting documents to manufacturing. • Safely and productively use equipment. Follow work schedule. • Review checklists with teacher. • Forecast potential challenges and offer solutions. • Explain next steps and contingencies.	responsibility, organization, independent work, collaboration, initiative, and self-regulation. PROJECT DEVELOPMENT EVALUATION. ACTIVITY 1.2 EVALUATION RUBRIC
Activity 2 Accommodations	Connections
Assembly of each table part can present different challenges. Students need to have alternative methods for completion to allow for success. Accommodations are listed alongside their part being assembled. **Table Top Assembly Accommodations** • Apply all safety rules and responsibilities including safety glasses, gloves, aprons and all other personal protective equipment. • Painters tape can be cut to size to emphasis the measurement of each sided of the tile. • Choose a cutting process student have outlined in their Job List and ability to use as stated in Safety Passport. • Cutting options include: horizontal bandsaw, vertical bandsaw, chop saw, cold cut saw, shear, hack saw, angle grinder. • Pre made jigs and fixtures aid and assist in completing parts accurately. • Preset controls keeps machinery use consistent and ready to use. (Autoweld) • Group work shares cutting and joining process.	**SEF Component 4 Curriculum, Teaching and Learning** Indicator 4.5 Instruction and assessment are differentiated **SEF Component 1 Assessment for, as and of Learning Connections** Indicator 1.2 & 1.4: Reviewing student profiles, learning portfolios, IEPs and assessment data will inform decisions regarding assessment tools and strategies.

• Alternative project. • Complete supporting documents: Daily work. Comparison to Work Schedule Calendar. Adjustment to Job List and Work Schedule. Forecasts of problems and concerns.	

Consolidation & Connections (Provide Opportunities for Reflection)

Activity 2 Reflection	Connections
Supporting documents and construction serve as a connection between theory and application. Organized paperwork; either electronically or hard copy, allow students to reflect on their accomplishments and areas requiring improvement. Conversing with the teacher will help focus and guide students to the next step giving opportunity for student input and collaboration. The consistency of teacher interaction with the students and their supporting documents will determine success or failure of the connection between the theory and the application.	**SEF Component 4 Curriculum, Teaching and Learning.** Indicator 4.2 A clear emphasis on high levels of achievement in literacy and numeracy **Component 1 Assessment for, as and of Learning.** Indicator 1.3 Students and educators build a common understanding of what students are learning. **Growing Success** . A high-yield instructional strategy that involves scaffolding instruction and providing appropriate amounts of support to students based on their needs – As students share their thoughts, the teacher can nurture conditions supporting scaffolding thereby elevating understanding across the whole class for all learners

Materials, Tools and Resources

Activity 2 Websites

Pinterest
Google Search

Activity 2 Publications

Modern Welding.
Student Success Differentiated Instruction Educator's Guide (2010)
The Ontario Curriculum Grades 9 and 10. Technological Education. Revised 2009
School Effectiveness Framework 2013
Growing Success
Leading Math Success
Think Literacy
Ontario's Equity and Inclusive Education Strategy
First Nations Metis Inuit

Activity 2 Computer Software

Board provided software.
Word processing.
Spreadsheet software.
CAD Software.

Activity 2 Human Resources

Educational Assistant
Industry Mentors
School IT specialist
Librarian

Activity 2 Appendices

- PROJECT DEVELOPMENT ASSESSMENT. ACTIVITY 1.2 ASSESSMENT CHECKLIST
- PROJECT DEVELOPMENT EVALUATION. ACTIVITY 1.2 EVALUATION RUBRIC

Activity 3 Project Portfolio and Presentation

Activity Description:
The project is considered complete with an organized log of all supporting documents and presentation of gathered information. Both the project and documents will compliment each other in the relationship between theory and application. A detailed analysis will identify productivity issues and planning alternatives for students to reflect and show proof of understanding. A presentation allows for students to demonstrate their knowledge and understanding of the related project Manufacturing processes and order of operations. The presentation will also include the student's opinion and connection to the manufacturing industry and our role in the environment. The goal is for students take a more active role in the steps and responsibilities in finishing a project using the design process in the most productive and efficient way.

Activity 3 Criteria and Instructions

Supporting Documents:
Drawing:

- A hand drawn or electronically made drawing of the table in a 3 sided view including title block and borders.

Material list:

- A complete list of all material used to make the table including paint.

Cut list:

- A list of all material that was cut including measurements and angles as well as waste and leftovers.

Equipment List:

- All equipment used to fabricate the table including PPE and hand tools including equipment maintenance tools such as wire cutters and wire brushes.

Work Log and calendar:

- The daily work recorded and adjustments aligned with the calendar including all rough notes and forecasts of potential problems.

Job List:

- A complete set of revised instructions on how to build a plant table. This is the job list rewritten with the knowledge of challenges such as timelines, equipment failure and bottlenecks. The focus of the Job List should be productivity and the design process.

Presentation:

- An explanation of supporting documents either written, electronic or orally.
- Identification to manufacturing industry and environmental stewardship.

MINDS ON

ENGAGING PRIOR KNOWLEDGE

Activity 3 Prior Knowledge	Connections
Teachers should have knowledge of individual student's specific understanding of the requirements for the submission of documents and presenting in front of others. Ultimately having students submit and communicate electronically helps prepare students for the growing dependency on technology and acknowledgement of our carbon footprint but the ability to speak publically can build confidence for students. Encouragement and opportunity should be made to help students be technologically literate and oral submissions together to ensure a better chance of success for the student. Conferencing with individual students strengths and areas requiring improvement can help guide students to achieve a higher grade.	**SEF Component 4 Curriculum, Teaching and Learning** Indicator 4.2 A clear emphasis on high levels of achievement in literacy and numeracy **Component 3 Student Engagement** Indicator 3.1 The teaching and learning environment is inclusive Indicator 3.2 Students' stated priorities that reflect the diversity, needs and interests Indicator 3.3 Students are partners in dialogue **The Ontario Curriculum, Grade 11-12, Revised 2009** Achievement Chart
Activity 3 Planning Notes	**Connections**
• Make sure WiFi and all board supported software is running. • Make sure all rubrics and templates are available to students. • Organize time outside of the shop to allow for completion. • Arrange computer labs and Chromebooks for student use. • Have office supplies and organizers.	**Teacher Tip:** Build in opportunities for students to practice their presentations inside or outside of the class time. This will ensure elevated student success and raise student confidence in demonstrating their achievement

ACTION Introduce or Extend Learning

Activity 3 Instructional Strategies	Connections

Teacher: • Provide samples and rubrics for students to follow. • Emphasis independence in completing the documents with all available tools and accommodations. • Collaborate with student on grade achievement. • Encourage creativity, innovation and entrepreneurship through submission of documents and future endeavours such as furniture making or contracting. • Make prior arrangements for students with anxieties with presentations. Student: • Organize and prepare supporting documents for presentation • Use samples and rubrics to complete reflections. • Conference with teacher on challenges. • Use all available resources to complete work	**SEF Component 4 Curriculum, Teaching and Learning** Indicator 4.2 A clear emphasis on high levels of achievement in literacy and numeracy. **Literacy Connection** Reading (research) Strategy: Engaging in Reading ▪ Sorting Ideas Using a Concept Map can be used in documenting their research on themes and styles **Guide to Effective Presentations** - https://www.enar.org/meetings/spring2016/program/presentation_guidelines.pdf
Activity 3 Assessment and Evaluation	Connections
Assessment: Rubrics at this stage include work habits and learning skills. How students address supporting documents is evidence of comprehension of the connection between theory and application. It is easier to write a Job List when work logs are detailed and aligned with the calendar. What students do with the information can be compared and/or measure with achievement categories. Assessment Tools: • Rubrics for: Knowledge and Understanding, Communication, Thinking and Application. Evaluation: Both the planning and fabrication have been evaluated. This allows for students to be apart of the marking process and more accountable for their grade. The supporting documents will be gauged against a rubric that clearly defines the expectations for a specific grade. Evaluation is based on the following: Knowledge and Understanding: • Clear understanding of project requirements. • Use of terms and concepts as they apply to the project. Thinking: • Ability to recognize mistakes and challenges. • Correction and level of change to plan to improve chances of success. Communications: • Organization of supporting documents.	**SEF Component 1 Assessment for, as and of Learning** Indicator 1.2 A variety of relevant and meaningful assessment data **SEF Component 4 Curriculum, Teaching and Learning** Indicator 4.3 Teaching and learning in the 21st Century SUPPORTING DOCUMENTS AND PRESENTATION. ACTIVITY 1.3 ASSESSMENT RUBRIC SUPPORTING DOCUMENTS AND PRESENTATION. ACTIVITY 1.3 EVALUATION RUBRIC **Teacher Tip:**

● Presentation of documents. Application: ● The ability to connect documents to project. Learning Skills ▪ Through observation and conferencing, students will be assessed formally or informally. ▪ The teacher will document the following: - the student' s skills pertaining to conflict management skills; - student's ability to work effectively as a team member; - student's initiative, leadership and participation in a group. ▪ Conferencing assessment can take place on a daily basis. Be sure to provide encouragement and praising effort, as tasks are complete building on a positive self-image.	Track student progress throughout the project as evaluation, and then assess achievement at end using rubric **Achievement Chart** for explicit use of vocabulary and terminology
Activity 3 Accommodations	Connections
Students who struggle with numeracy and literacy as well as computer anxieties need to be encouraged to take small steps. Chunk info into parts of the period or try something the student suggests like a scribe or peer. Supporting Documents: ● Submitted using either paper or computer generated. ● Scribe. ● Joint teacher student submission. ● Chunked data. ● Word banks. ● Templates. ● Samples. ● Group assistance. Presentation: ● Alternate location for oral presentations. ● Written or computer generated submission. ● Recorded submission. ● White board and blackboard. ● Creative alternative. ● Group presentation	**SEF Component 1 Assessment for, as and of Learning** Indicator 1.2 A variety of relevant and meaningful assessment data Indicator 1.7 Ongoing communication about learning **Learning for All - Universal Design and Differentiated Instruction:** In differentiating instruction according to students' interests, a teacher attempts to increase the likelihood that any given lesson or project is highly engaging and personally meaningful for each student in the class. Teachers who know students' interests can vary projects, themes, and examples used in instruction to reflect those interests.

Consolidation & Connections

Provide Opportunities for Reflection

Activity 3 Reflection Paper and Presentation	Connections
Students are to draw from their experience during the project and explain their overall understanding in their presentation, and prepare a response to how technology can affect the environment and society. They are to include identification of health and safety as well as career opportunities. Promoting literacy and self advocacy helps support students self esteem and confidence. The reflection paper can include aspirations and future endeavors. Students should be encouraged to be creative and innovative and be prepared to forecast their futures. The design process concludes with reflection for the purpose of improving the overall process and final product.	**SEF Component 2 Classroom Leadership Connections** Indicator 2.2- input, through the reflection papers will help refine instruction to improve student learning **SEF Component 1 Assessment for,as and of Learning.** Indicator 1.1 Assessment is connected to the curriculum.Technology, The Environment and Society C1,C2 Professional Practice and Career Opportunities. D1, D2 FNMI extension: Paper or reflection includes cultural; perspectives. **ICE connection:** Give students the confidence to develop strategies to implement and sustain their ideas while considering the impacts and consequences their innovation has on the world around them.

Materials, Tools and Resources

Activity 3 Websites
Pinterest Google Search **Guide to Effective Presentations** - https://www.enar.org/meetings/spring2016/program/presentation_guidelines.pdf
Activity 3 Publications

Modern Welding.
Student Success Differentiated Instruction Educator's Guide (2010)
The Ontario Curriculum Grades 9 and 10. Technological Education. Revised 2009
School Effectiveness Framework 2013
Growing Success
Leading Math Success
Think Literacy
Ontario's Equity and Inclusive Education Strategy
First Nations Metis Inuit

Activity 3 Computer Software

Board provided software.
Word processing.
Spreadsheet software.
CAD Software.

Activity 3 Human Resources

Educational Assistant
Industry Mentors
School IT specialist
Librarian

Activity 3 Appendices

- SUPPORTING DOCUMENTS AND PRESENTATION. ACTIVITY 1.3 ASSESSMENT CHECKLIST RUBRIC
- SUPPORTING DOCUMENTS AND PRESENTATION. ACTIVITY 1.3 EVALUATION RUBRIC

MANUFACTURING PLANNING OPERATIONS ASSESSMENT ACTIVITY 1.1 ASSESSMENT RUBRIC

TIME PERIOD ASSESSED:

STUDENT NAME:	Incomplete	Level 1 Not Satisfactory	Level 2 Satisfactory	Level 3 Good	Level 4 Excellent	Level
	*No existing ideas, designs or plans	*Oral or written submission demonstrates limited	*Oral or written submission demonstrates	*Oral or written submissions demonstrates	*Oral or written submission demonstrates	

MANUFACTURING INDUSTRY **Knowledge and Understanding**	provided.	knowledge of content. *Oral or written submission demonstrates limited understanding of content.	some knowledge of content. *Oral or written submission demonstrates some understanding of content.	considerable knowledge of content. *Oral or written submission demonstrates considerable understanding of content.	thorough knowledge of content. *Oral or written submission demonstrates thorough understanding of content.	
DESIGN FUNDAMENTALS **Thinking** **Communication**	*No communication attempts have been made. *No designs or plans provided.	*Supporting document setup demonstrates limited in planning. *Processing skills are used with limited effectiveness. *Critical/ Creativeness used with limited effectiveness. *Information organized with limited effectiveness. *Communication of purpose with limited effectiveness. *Vocabulary and terminology used with limited effectiveness.	*Supporting document setup demonstrates some effectiveness in planning. *Processing skills are used with some effectiveness. *Critical/ Creativeness used with some effectiveness. *Information organized with some effectiveness. *Communication of purpose with some effectiveness. *Vocabulary and terminology used with some effectiveness.	*Supporting document setup demonstrates considerable effectiveness in planning. *Processing skills are used with considerable effectiveness. *Critical/ Creativeness used with a high degree considerable effectiveness. *Information organized with considerable effectiveness. *Communication of purpose with considerable effectiveness. *Vocabulary and terminology used with considerable effectiveness.	*Supporting document setup demonstrates a high degree of effectiveness in planning. *Processing skills are used at a high degree of effectiveness. *Critical/ Creativeness used with a high degree of effectiveness. *Information organized with a high degree of effectiveness. *Communication of purpose with a high degree of effectiveness. *Vocabulary and terminology used with a high degree of effectiveness.	
MATERIALS	*No materials provided.	*Limited materials provided.	*Some materials provided.	*Most but not all materials included. *Missing items such as graph paper.	*All materials are organized including work log, sketches and electronic documents.	
TOOLS AND EQUIPMENT **Knowledge and Understanding** **Thinking**	*Invalid Safety passport . *Tool and equipment use is prohibited.	*Safety passports demonstrates limited knowledge of content. *Safety Passports demonstrates limited understanding of content. *Uses critical thinking in the use of tools with limited effectiveness.	*Safety passports demonstrates some knowledge of content. *Safety Passports demonstrates some understanding of content. *Uses critical thinking in the use of tools with some effectiveness.	*Safety passports demonstrates considerable knowledge of content. *Safety Passports demonstrates considerable understanding of content. *Uses critical thinking in the use of tools with considerable effectiveness.	*Safety passports demonstrates thorough knowledge of content. *Safety Passports demonstrates thorough understanding of content. *Uses critical thinking in the use of tools with a high degree of effectiveness.	

NEXT STEPS:	LEVEL:

MANUFACTURING PLANNING OPERATIONS EVALUATION
ACTIVITY 1.1 EVALUATION RUBRIC
DUE DATE:

STUDENT NAME:	Incomplete (below 50%) 0.5	Level 1 (50-59%) 1	Level 2 (60-69%) 2	Level 3 (70-79%) 3	Level 4 (80-100%) 4	MARK
MATERIAL LIST/ EQUIPMENT LIST/ CUT LIST **Thinking** **Communication**	*No existing ideas, designs or plans provided.	*Supporting document setup demonstrates limited in planning. *Processing skills are used with limited effectiveness. *Critical/ Creativeness used with limited effectiveness. *Information organized with limited effectiveness. *Communication of purpose with limited effectiveness. *Vocabulary and	*Supporting document setup demonstrates some effectiveness in planning. *Processing skills are used with some effectiveness. *Critical/ Creativeness used with some effectiveness. *Information organized with some effectiveness. *Communication	*Supporting document setup demonstrates considerable effectiveness in planning. *Processing skills are used with considerable effectiveness. *Critical/ Creativeness used with a high degree considerable effectiveness. *Information organized with considerable effectiveness.	*Supporting document setup demonstrates a high degree of effectiveness in planning. *Processing skills are used at a high degree of effectiveness. *Critical/ Creativeness used with a high degree of effectiveness. *Information organized with a high degree of effectiveness. *Communication of	

		terminology used with limited effectiveness.	of purpose with some effectiveness. *Vocabulary and terminology used with some effectiveness.	*Communication of purpose with considerable effectiveness. *Vocabulary and terminology used with considerable effectiveness.	purpose with a high degree of effectiveness. *Vocabulary and terminology used with a high degree of effectiveness.	
JOB PLAN **Thinking** **Communication**	*No communication attempts have been made. *No designs or plans provided.	*Supporting document setup demonstrates limited in planning. *Processing skills are used with limited effectiveness. *Critical/ Creativeness used with limited effectiveness. *Information organized with limited effectiveness. *Communication of purpose with limited effectiveness. *Vocabulary and terminology used with limited effectiveness.	*Supporting document setup demonstrates some effectiveness in planning. *Processing skills are used with some effectiveness. *Critical/ Creativeness used with some effectiveness. *Information organized with some effectiveness. *Communication of purpose with some effectiveness. *Vocabulary and terminology used with some effectiveness.	*Supporting document setup demonstrates considerable effectiveness in planning. *Processing skills are used with considerable effectiveness. *Critical/ Creativeness used with a high degree considerable effectiveness. *Information organized with considerable effectiveness. *Communication of purpose with considerable effectiveness. *Vocabulary and terminology used with considerable effectiveness.	*Supporting document setup demonstrates a high degree of effectiveness in planning. *Processing skills are used at a high degree of effectiveness. *Critical/ Creativeness used with a high degree of effectiveness. *Information organized with a high degree of effectiveness. *Communication of purpose with a high degree of effectiveness. *Vocabulary and terminology used with a high degree of effectiveness.	
WORK LOG **Communication**	*Nothing provided to grade.	*Information organized with limited effectiveness. *Communication of purpose with limited effectiveness. *Vocabulary and terminology used with limited effectiveness.	*communication of purpose with some effectiveness. *Vocabulary and terminology used with some effectiveness.	*Information organized with considerable effectiveness. *Communication of purpose with considerable effectiveness. *Vocabulary and terminology used with considerable effectiveness.	*Information organized with a high degree of effectiveness. *Communication of purpose with a high degree of effectiveness. *Vocabulary and terminology used with a high degree of effectiveness.	
CALENDAR **Application**	*Nothing provided to grade.	*Calendar and Job plan have limited effectiveness.	*Calendar and Job plan have same effectiveness.	*Calendar and Job plan have considerable effectiveness.	*Calendar and Job plan have connections with a high degree of effectiveness.	

ACTIVITY 1.1 EVALUATION MARK: /16

NEXT STEPS:

PROJECT DEVELOPMENT ASSESSMENT. ACTIVITY 1.2
ASSESSMENT RUBRIC

TIME PERIOD ASSESSED:

STUDENT NAME:	Incomplete	Level 1 Not Satisfactory	Level 2 Satisfactory	Level 3 Good	Level 4 Excellent	Level
DESIGN PROCESS **Thinking** **Communication**	*No existing ideas, designs or plans provided.	*Supporting document setup demonstrates limited in planning. *Processing skills are used with limited effectiveness. *Critical/ Creativeness used with limited effectiveness. *Information organized with limited effectiveness. *Communication of purpose with limited effectiveness. *Vocabulary and terminology used with limited	*Supporting document setup demonstrates some effectiveness in planning. *Processing skills are used with some effectiveness. *Critical/ Creativeness used with some effectiveness. *Information organized with some effectiveness. *Communication of purpose with some	*Supporting document setup demonstrates considerable effectiveness in planning. *Processing skills are used with considerable effectiveness. *Critical/ Creativeness used with a high degree considerable effectiveness. *Information organized with considerable effectiveness. *Communication of purpose with	*Supporting document setup demonstrates a high degree of effectiveness in planning. *Processing skills are used at a high degree of effectiveness. *Critical/ Creativeness used with a high degree of effectiveness. *Information organized with a high degree of effectiveness. *Communication of purpose with a high degree of	

		effectiveness.	effectiveness. *Vocabulary and terminology used with some effectiveness.	considerable effectiveness. *Vocabulary and terminology used with considerable effectiveness.	effectiveness. *Vocabulary and terminology used with a high degree of effectiveness.	
PROCESS PLANNING **Thinking** **Application**	*No communication attempts have been made. *No designs or plans provided.	*Supporting document setup demonstrates limited in planning. *Processing skills are used with limited effectiveness. *Critical/ Creativeness used with limited effectiveness. *Supporting documents compliment application with limited effectiveness.	*Supporting document setup demonstrates some effectiveness in planning. *Processing skills are used with some effectiveness. *Critical/ Creativeness used with some effectiveness. *Supporting documents compliment application with some effectiveness.	*Supporting document setup demonstrates considerable effectiveness in planning. *Processing skills are used with considerable effectiveness. *Critical/ Creativeness used with considerable effectiveness. *Supporting documents compliment application with considerable effectiveness.	*Supporting document setup demonstrates a high degree of effectiveness in planning. *Processing skills are used at a high degree of effectiveness. *Critical/ Creativeness used with a high degree of effectiveness. *Supporting documents compliment application with a high degree of effectiveness.	
USING MATERIALS, TOOLS AND EQUIPMENT **Application**	*Nothing provided to grade.	*Transfers knowledge and skills in familiar contexts limited effectiveness. *Makes connections within and between various contexts with limited effectiveness.	*Transfers knowledge and skills in familiar contexts with some effectiveness. *Makes connections within and between various contexts with some effectiveness.	*Transfers knowledge and skills in familiar contexts with considerable effectiveness. *Makes connections within and between various contexts with considerable effectiveness.	*Transfers knowledge and skills in familiar contexts with a high degree of effectiveness. *Makes connections within and between various contexts with a high degree of effectiveness.	
METROLOGY SKILLS **Thinking** **Application**	*Nothing provided to grade.	*Supporting document setup demonstrates limited in planning. *Processing skills are used with limited effectiveness. *Critical/ Creativeness used with limited effectiveness. *Transfers knowledge and skills in familiar contexts limited effectiveness.	*Supporting document setup demonstrates some effectiveness in planning. *Processing skills are used with some effectiveness. *Critical/ Creativeness used with some effectiveness. *Transfers knowledge and skills in familiar contexts with some effectiveness.	*Supporting document setup demonstrates considerable effectiveness in planning. *Processing skills are used with considerable effectiveness. *Critical/ Creativeness used with a high degree considerable effectiveness. *Transfers knowledge and skills in familiar contexts with considerable effectiveness.	*Supporting document setup demonstrates a high degree of effectiveness in planning. *Processing skills are used at a high degree of effectiveness. *Critical/ Creativeness used with a high degree of effectiveness *Transfers knowledge and skills in familiar contexts with a high degree of effectiveness.	

NEXT STEPS: **ASSESSMENT LEVEL:**

PROJECT DEVELOPMENT EVALUATION. ACTIVITY 1.2
EVALUATION RUBRIC

DUE DATE:

STUDENT NAME:	Incomplete (below 50%) 0.5	Level 1 (50-59%) 1	Level 2 (60-69%) 2	Level 3 (70-79%) 3	Level 4 (80-100%) 4	MARK
MATERIAL LIST/ EQUIPMENT LIST/ CUT LIST **Communication**	*No existing ideas, designs or plans provided.	*Information organized with limited effectiveness. *Communication of purpose with limited effectiveness. *Vocabulary and terminology used with limited effectiveness.	*Information organized with some effectiveness. *Communication of purpose with some effectiveness. *Vocabulary and terminology used with some effectiveness.	*Information organized with considerable effectiveness. *Communication of purpose with considerable effectiveness. *Vocabulary and terminology used with considerable effectiveness.	*Information organized with a high degree of effectiveness. *Communication of purpose with a high degree of effectiveness. *Vocabulary and terminology used with a high degree of effectiveness.	
JOB PLAN **Thinking**	*No communication attempts have been made. *No designs or plans provided.	*Supporting document setup demonstrates limited in planning. *Processing skills are used with limited effectiveness. *Critical/ Creativeness used with limited effectiveness.	*Supporting document setup demonstrates some effectiveness in planning. *Processing skills are used with some effectiveness. *Critical/ Creativeness used with some effectiveness.	*Supporting document setup demonstrates considerable effectiveness in planning. *Processing skills are used with considerable effectiveness. *Critical/ Creativeness used with considerable effectiveness.	*Supporting document setup demonstrates a high degree of effectiveness in planning. *Processing skills are used at a high degree of effectiveness. *Critical/ Creativeness used with a high degree of effectiveness.	

SHOP SKILLS/ CALENDAR **Application**	*Nothing provided to grade.	*Supporting documents compliment application with limited effectiveness. *Transfers knowledge and skills in familiar contexts limited effectiveness. *Makes connections within and between various contexts with limited effectiveness.	*Supporting documents compliment application with some effectiveness. *Transfers knowledge and skills in familiar contexts with some effectiveness. *Makes connections within and between various contexts with some effectiveness.	*Supporting documents compliment application with considerable effectiveness. *Transfers knowledge and skills in familiar contexts with considerable effectiveness. *Makes connections within and between various contexts with considerable effectiveness.	*Supporting documents compliment application with a high degree of effectiveness. *Transfers knowledge and skills in familiar contexts with a high degree of effectiveness. *Makes connections within and between various contexts with a high degree of effectiveness.	
WORK LOG/REFLECTION **Knowledge and Understanding**	*Nothing provided to grade.	*Limited knowledge of facts, equipment, terminology and materials. *Limited understanding of procedures, processes and standards..	*Some knowledge of facts, equipment, terminology and materials. *Some understanding of procedures, processes and standards.	*Considerable knowledge of facts, equipment, terminology and materials. *Considerable understanding of procedures, processes and standards.effectiveness.	*Thorough knowledge of facts, equipment, terminology and materials. *Thorough understanding of procedures, processes and standards.	

ACTIVITY 1.2 EVALUATION MARK: /16

SUPPORTING DOCUMENTS AND PRESENTATION. ACTIVITY 1.3 ASSESSMENT RUBRIC

TIME PERIOD ASSESSED:

STUDENT NAME:	Incomplete	Level 1 Not Satisfactory	Level 2 Satisfactory	Level 3 Good	Level 4 Excellent	Level
MANUFACTURING INDUSTRY **Knowledge and Understanding**	*No existing ideas, designs or plans provided.	*Oral or written submission demonstrates limited knowledge of content. *Oral or written submission demonstrates limited understanding of content.	*Oral or written submission demonstrates some knowledge of content. *Oral or written submission demonstrates some understanding of content.	*Oral or written submissions demonstrates considerable knowledge of content. *Oral or written submission demonstrates considerable understanding of content.	*Oral or written submission demonstrates thorough knowledge of content. *Oral or written submission demonstrates thorough understanding of content.	

DESIGN FUNDAMENTALS **Thinking** **Communication**	*No communication attempts have been made. *No designs or plans provided.	*Supporting document setup demonstrates limited in planning. *Processing skills are used with limited effectiveness. *Critical/ Creativeness used with limited effectiveness. *Information organized with limited effectiveness. *communication of purpose with limited effectiveness. *Vocabulary and terminology used with limited effectiveness.	*Supporting document setup demonstrates some effectiveness in planning. *Processing skills are used with some effectiveness. *Critical/ Creativeness used with some effectiveness. *Information organized with some effectiveness. *communication of purpose with some effectiveness. *Vocabulary and terminology used with some effectiveness.	*Supporting document setup demonstrates considerable effectiveness in planning. *Processing skills are used with considerable effectiveness. *Critical/ Creativeness used with a high degree considerable effectiveness. *Information organized with considerable effectiveness. *communication of purpose with considerable effectiveness. *Vocabulary and terminology used with considerable effectiveness.	*Supporting document setup demonstrates a high degree of effectiveness in planning. *Processing skills are used at a high degree of effectiveness. *Critical/ Creativeness used with a high degree of effectiveness. *Information organized with a high degree of effectiveness. *communication of purpose with a high degree of effectiveness. *Vocabulary and terminology used with a high degree of effectiveness.	
MATERIALS	*No materials provided.	*Limited materials provided.	*Some materials provided.	*Most but not all materials included. *Missing items such as graph paper.	*All materials are organized including work log, sketches and electronic documents.	
TOOLS AND EQUIPMENT **Knowledge and Understanding** **Thinking**	*Invalid Safety passport . *Tool and equipment use is prohibited.	*Safety passports demonstrates limited knowledge of content. *Safety Passports demonstrates limited understanding of content. *Uses critical thinking in the use of tools with limited effectiveness.	*Safety passports demonstrates some knowledge of content. *Safety Passports demonstrates some understanding of content. *Uses critical thinking in the use of tools with some effectiveness.	*Safety passports demonstrates considerable knowledge of content. *Safety Passports demonstrates considerable understanding of content. *Uses critical thinking in the use of tools with considerable effectiveness.	*Safety passports demonstrates thorough knowledge of content. *Safety Passports demonstrates thorough understanding of content. *Uses critical thinking in the use of tools with a high degree of effectiveness.	

NEXT STEPS: **ASSESSMENT LEVEL:**

SUPPORTING DOCUMENTS AND PRESENTATION. ACTIVITY 1.3 EVALUATION RUBRIC

DUE DATE:

STUDENT NAME:	Incomplete (below 50%) 0.5	Level 1 (50-59%) 1	Level 2 (60-69%) 2	Level 3 (70-79%) 3	Level 4 (80-100%) 4	MARK
WORK LOG PRESENTATION Communication	*No existing ideas, designs or plans provided.	*Information organized with limited effectiveness. *Communication of purpose with limited effectiveness. *Vocabulary and terminology used with limited effectiveness.	*Information organized with some effectiveness. *Communication of purpose with some effectiveness. *Vocabulary and terminology used with some effectiveness.	*Information organized with considerable effectiveness. *Communication of purpose with considerable effectiveness. *Vocabulary and terminology used with considerable effectiveness.	*Information organized with a high degree of effectiveness. *Communication of purpose with a high degree of effectiveness. *Vocabulary and terminology used with a high degree of effectiveness.	

MATERIAL LIST/ EQUIPMENT LIST/ CUT LIST **Thinking**	*No communication attempts have been made. *No designs or plans provided.	*Supporting document setup demonstrates limited in planning. *Processing skills are used with limited effectiveness. *Critical/ Creativeness used with limited effectiveness.	*Supporting document setup demonstrates some effectiveness in planning. *Processing skills are used with some effectiveness. *Critical/ Creativeness used with some effectiveness.	*Supporting document setup demonstrates considerable effectiveness in planning. *Processing skills are used with considerable effectiveness. *Critical/ Creativeness used with considerable effectiveness.	*Supporting document setup demonstrates a high degree of effectiveness in planning. *Processing skills are used at a high degree of effectiveness. *Critical/ Creativeness used with a high degree of effectiveness.	
CALENDAR **Application**	*Nothing provided to grade.	*Supporting documents compliment application with limited effectiveness.	*Supporting documents compliment application with some effectiveness.	*Supporting documents compliment application with considerable effectiveness.	*Supporting documents compliment application with a high degree of effectiveness.	
JOB LIST **KNOWLEDGE AND UNDERSTANDING**	*Nothing provided to grade.	*Limited knowledge of facts, equipment, terminology and materials. *Limited understanding of procedures, processes and standards..	*Some knowledge of facts, equipment, terminology and materials. *Some understanding of procedures, processes and standards.	*Considerable knowledge of facts, equipment, terminology and materials. *Considerable understanding of procedures, processes and standards.effectiveness.	*Thorough knowledge of facts, equipment, terminology and materials. *Thorough understanding of procedures, processes and standards.	

FINAL MARK CONSOLIDATION

ACTIVITY 1.1 EVALUATION MARK: /16
ACTIVITY 1.2 EVALUATION MARK: /16
ACTIVITY 1.3 EVALUATION MARK: /16

TOTAL EVALUATION MARK: /48
COMMENTS: